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EXAMINER

KERNS, KEVIN P

ART UNIT PAPER NUMBER

1725

DATE MAILED: 11/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/972,142

Applicant(s)

LOFFLER ET AL.

Examiner

Kevin P. Kerns

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) 25-48 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 and 49 is/are rejected.
- 7) ☒ Claim(s) 23 and 24 is/are objected to.
- 8) ☒ Claim(s) 1-49 are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 October 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4/17/02; 12/6/02; 10/12/04
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicants' election of Group Ia (claims 1-24 and 49) in the reply filed on October 12, 2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 3' (Figures 1 and 7); "48" (Figure 1); and "64" (Figure 3). Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

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3. The drawings are objected to because reference numbers "1-a" and "1-b" should be changed to "1a" and "1b", respectively. In Figures 10A and 10B, these sketches are informal, and new formal drawings are required. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract

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on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

5. The disclosure is objected to because of the following informalities: in paragraph [0001], 2nd line, the status of the related application should be updated (for example, to include that it is "abandoned"). Appropriate correction is required.

Claim Objections

6. Claims 23 and 24 are objected to because of the following informalities: in claim 23, 3rd line, "the" should be changed to "an" before "anode". In claim 24, last line, "into" should be added after "entry". Appropriate correction is required.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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8. Claims 1, 2, 8-11, 13, 16-24, and 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Hamada et al. (US 5,609,834).

Hamada et al. disclose a plate reformer for conducting simultaneous endothermic (steam reforming) and exothermic (combustion) reactions via a stack of bicatalytic reactor cells that include a series of first and second reactor channels; a plate-shaped reforming chamber 2 sandwiched between a pair of plate-shaped combustion chambers 4, all of which contain respective heat exchange sections (plates 5); a plurality of coated thin metal, heat-conductive separator plates and fuel distribution plates 6 for transverse flow of a reaction stream, and forming corrugated regions via a plurality of spheres; a heater operative to preheat a reaction stream; and an inlet and an outlet for the exothermic and endothermic reaction streams, such that the bicatalytic reactor cell is operative to supply an anode 41a of a fuel cell 40 with hydrogen gas (abstract; column 1, lines 6-9; column 2, lines 66-67; column 3, lines 1-67; column 4, lines 1-31 and 55-67; column 5, line 1 through column 8, line 54; and Figures 1-3).

9. Claims 1, 2, 8-11, 13, 16-18, 20-24, and 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Furuya et al. (JP 6-111838).

Furuya et al. disclose a reforming system for supplying a fuel cell system, in which reforming catalysts are placed on the grooves of one side plate and combustion catalysts are placed on the grooves of the other side plate, creating reaction fluid flow passages, with the reforming system operative to conduct simultaneous endothermic (steam reforming) and exothermic (combustion) reactions via a stack of bicatalytic

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reactor cells that include a series of first and second reactor channels; a plate-shaped reforming chamber and a combustion chamber, both of which contain heat exchange sections; a plurality of coated thin metal, heat-conductive separator plates and fuel distribution plates for transverse flow of a reaction stream, and forming corrugated regions via a plurality of spheres; and a heater operative to preheat a reaction stream; and an inlet and an outlet for the exothermic and endothermic reaction streams, such that the bicatalytic reactor cell is operative to supply an anode of a fuel cell with hydrogen gas (abstract; and Figures 1-19).

10. Claims 1, 2, 8-11, 13, 16-18, 20-24, and 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakamura et al. (JP 6-219703).

Nakamura et al. disclose a miniaturized fuel reformer for conducting simultaneous endothermic (steam reforming) and exothermic (combustion) reactions via a stack of bicatalytic reactor cells that include a series of first and second reactor channels; a plate-shaped reforming chamber and a plate-shaped combustion chamber, both of which contain heat exchange sections; a plurality of coated thin metal, heat-conductive separator plates and fuel distribution plates for transverse flow of a reaction stream, and forming corrugated regions; a heating unit 112 operative to preheat a reaction stream; and an inlet and an outlet for the exothermic and endothermic reaction streams, such that the bicatalytic reactor cell is operative to supply an anode of a fuel cell with hydrogen gas (abstract; and Figures 1-4).

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11. Claims 1, 2, 8-11, 13, 16-18, 20-24, and 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Koga et al. (US 5,015,444).

Koga et al. disclose a plate type reformer for conducting simultaneous endothermic (steam reforming) and exothermic (combustion) reactions via a stack of bicatalytic reactor cells that include a series of first and second reactor channels; a plurality of coated thin metal, heat-conductive separator plates and dispersion plates for transverse flow of a reaction stream; a main unit I that includes a reforming plate 14 and a combustion plate 18 and forming corrugated regions; a heater operative to preheat a reaction stream; and an inlet and an outlet for the exothermic and endothermic reaction streams, such that the bicatalytic reactor cell is operative to supply an anode of a fuel cell with hydrogen gas (abstract; column 1, lines 6-12 and 51-68; column 2, lines 1-11 and 28-68; column 3, lines 1-68; column 4, lines 1-44; and Figures 1, 2, and 5).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

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under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claims 3-7, 12, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over any one of Hamada et al. (US 5,609,834), Furuya et al. (JP 6-111838), Nakamura et al. (JP 6-219703), or Koga et al. (US 5,015,444).

Hamada et al., Furuya et al., Nakamura et al., and Koga et al. individually disclose the elements of claim 1 above. Neither Hamada et al., Furuya et al., Nakamura et al., nor Koga et al. discloses the specific metal alloy materials, thicknesses and distances between the thin metal separators, and the herringbone pattern of the flow of the reaction stream. However, one of ordinary skill in the art would have recognized that the specific metal alloy material, thicknesses/distances of the thin metal separators, and a herringbone pattern of flow (as compared to conventional parallel flow), would have been obvious to obtain a more efficient and miniaturized bicatalytic reactor cell.

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571)

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272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin P. Kerns *Kevin Kerns 11/9/04*
Examiner
Art Unit 1725

KPK
kpk
November 9, 2004